A. Cross section of bad White Oak × 135.
B. " " good " " × 135.
C. " " Carya porcina × 112, grouping of ducts and pushing aside of Medullary rays.
D. Fragment of Medullary ray showing the pits or pores in the walls, × 300.

An improvement in the construction of the Hypsometrical Aneroid. By Dr. Persifor Frazer.

(*Read before the American Philosophical Society, March 2, 1883.*)

While in France last year the idea occurred to the writer to lessen the weight of the delicate Hicks Barometer by constructing as much as possible of it of aluminium. Supposing that this could be done without difficulty, though of course at an increased expense, the writer devised a case of cork to contain it, and wrote to Mr. Hicks of London asking him to make the attempt. After a number of interviews it was finally estimated that the cost of the new form of aneroid should not exceed £10, or just double that of the ordinary instrument of brass in a wooden case. Delays were experienced from the beginning and added very much to the expense of the instruments when they finally arrived here.

First it was found difficult to produce an aluminium dial plate with a graduation of the requisite delicacy and accuracy. Then the internal supports could not be easily cast in that metal of the shapes necessary to build the frame for the more delicate moving parts.

Finally the writer was obliged to leave England without having received the barometers. When they arrived a few days ago the Government duty on them was $30.40 a piece, added to which Mr. Hicks had found it necessary to increase the original charge of £10 to £15 apiece. In consequence they cost a little over $105 apiece.

They are, however, creditable to Mr. Hicks's workmanship, and if their manufacture should increase, could no doubt be obtained at a very much reduced price.*

In order to prevent the breaking of the cork, by friction on the clothing, a light canvas cover was added, weighing 50 grams.

The following is a comparison of the weights of the ordinary Hicks barometer with one of them.

	Old form.		New form.	
Case and strap,	400 grams.	(wood)	150 grams.	(cork)
Aneroid,	1000 "	(brass)	400 "	(Aluminium)
Canvas cover,	——		50 "	
Total weight,	1400 "		600 "	
" "	or 3.09 lbs.	(av.)	1.323 lbs.	(av.)

The ordinary instrument weighs, therefore, 2¼ times as much as the new form, the weight of the old case being closely that of the new barometer.

* A letter received from Mr. Hicks, after the above was in print, reiterates the difficulties with which he contended, and states that notwithstanding the experience gained in making mine, he cannot deliver them for less than £15 apiece.